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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/696,738	10/28/2003	Paul Yager	128-02	6310

23713 7590 06/07/2004

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EXAMINER	
VALENTIN, JUAN D	

ART UNIT	PAPER NUMBER
2877	

DATE MAILED: 06/07/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/696,738	YAGER ET AL.	
	Examiner	Art Unit	
	Juan D Valentin II	2877	

-- Th MAILING DATE of this communication appears on the cover sheet with the correspondenc address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-64* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-64* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *28 October 2003* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. New corrected drawings are required in this application because Fig. 5 is undecipherable. Applicant is advised to employ the services of a competent patent draftsperson outside the Office, as the U.S. Patent and Trademark Office no longer prepares new drawings. The corrected drawings are required in reply to the Office action to avoid abandonment of the application. The requirement for corrected drawings will not be held in abeyance.

2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the waveguide and optical fiber of claims 31 & 32 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 31 & 32 recites the limitation "said first refractive index layer" in line 1. There is insufficient antecedent basis for this limitation in these claims.

4. Claim 36 recites the limitation "said second layer" in line 2. There is insufficient antecedent basis for this limitation in these claims.

5. Claims 31 & 32 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Examiner cannot come to an understanding as to how exactly the claimed waveguide/optical fiber works in conjunction with the claimed invention. Applicant has not provided enough support in both the drawings and specification for the Examiner to understand how an optical fiber or waveguide work in conjunction with a dielectric layer and the conducting layer? Claims 31 & 32 will be examined to the best of the Examiners understanding of the claimed invention.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claim 1-8, 10, 11, 13, 14, 16, 17, 19-22, & 25-64 rejected under 35 U.S.C. 102(b) as being fully anticipated by Johansen (IPN WO 01/69209).

Claim 1

Johansen in conjunction with Fig. 9, a surface plasmon resonance sensor for sensing the refractive index of a probe region (pg. 9, line 16-pg. 10, line 18) comprising a polychromatic light source 800 for generating light propagating along an incident light propagation axis, a

polarizer 870 in optical communication with said polychromatic light source 800 for selecting the polarization state of said light, an optical assembly 880, 883, 886 in optical communication with said polychromatic light source 800, said optical assembly comprising a dielectric layer 880, a dielectric sample layer 883 and a conducting layer (Fig. 2c, 220) positioned between said dielectric layer 880 and said dielectric sample layer 883, wherein illumination of said optical assembly with said light generates light propagating along a reflected light propagation axis, wherein a portion of said dielectric sample layer 883 adjacent to said conducting film (Fig. 2c, 220) comprises the probe region, a detector 920 in optical communication with said optical assembly 880, 883, ,886 for detecting said light propagating along said reflected light axis, thereby sensing the refractive index of said probe region, and a selectably adjustable wavelength selector 860 positioned in the optical path between said light source 800 and said detector 920 for transmitting light having a distribution of transmitted wavelengths selected to generate surface plasmons on a surface of said conducting layer (Fig. 2c, 220) in contact with said dielectric sample layer 883 (pg. 6, line 28-pg. 7, line 26 & pg. 10, line 20-pg. 11, line 2).

Claim 2

Johansen as applied above, further discloses a light collection and focusing element 900, 910 positioned between said optical assembly 880, 883, 886 and said detector 920, said light collection and focusing element 900, 910 for collecting said light propagating along the reflected light propagation axis and focusing light propagating along the reflected light propagation axis onto said detector 920.

Claim 3

Johansen as applied above further discloses a collimating optical element 830, 840, 850 for collimating light from said polychromatic light source 800, wherein said collimating optical element 830, 840, 850 is positioned between said polychromatic light element 800 and said optical assembly 880, 883, 886.

Claim 4

Johansen as applied above further discloses where said collimating optical element 850 comprises a first lens 830, a pinhole 840, and a second lens 850 each positioned between said polychromatic light source 800 and said optical assembly 880, 883, 886.

Claim 5

Johansen as applied above further discloses wherein said selectably adjustable wavelength selector is positioned between said optical assembly and said detector (pg. 6, lines 3-5).

Claim 6

Johansen as applied above further discloses wherein said selectably adjustable wavelength selector 860 is positioned between said polychromatic light source 800 and said optical assembly 880, 883, 886.

Claim 7

Johansen as applied above further discloses wherein said selectably adjustable wavelength selector 860 is an optical interference filter comprising a fabry-perot etalon (pg. 11, lines 9-12, pg. 9, lines 6-11).

Claim 10

Johansen as applied above further discloses wherein said optical interference filter 860 is rotationally adjustable about an axis which is orthogonal to said incident light propagation axis, wherein rotation of said optical interference filter selectably adjusts the distribution of transmitted wavelengths (Fig. 8b, pg. 9, lines 6-11).

Claims 11 & 14

Johansen as applied above further discloses wherein rotation of said optical interference filter selectably adjusts the center wavelength of the distribution of transmitted wavelengths (pg. 10, line 20-pg. 11, line 2).

Claim 13

Johansen as applied above further discloses wherein said optical interference filter is rotationally adjustable about an axis which is orthogonal to said reflected light propagation axis, wherein rotation of said optical interference filter selectably adjusts the distribution of transmitted wavelengths (pg. 6, lines 3-5 & pg. 9, lines 6-11, Fig. 8b).

Claim 16

Johansen as applied above further discloses wherein said optical interference is rotationally adjustable about an axis which is orthogonal to said incident light propagation axis, wherein rotation of said optical interference filter selectably adjusts the distribution of wavelengths that are substantially mevented from transmitting through said optical interference filter 860 (Fig. 8b, pg. 9, lines 6-11 & pg. 10, line 20-pg. 11, line 2).

Claim 17

Johansen as applied above further discloses wherein said optical interference is rotationally adjustable about an axis which is orthogonal to said reflected light propagation axis,

wherein rotation of said optical interference filter selectably adjusts the distribution of wavelengths that are substantially mevented from transmitting through said optical interference filter 860 (Fig. 8b, pg. 9, lines 6-11, pg. 10, line 20-pg. 11, line 2, & pg. 6, lines 3-5).

Claim 19

Johansen as applied above further discloses wherein said distribution of transmitted wavelengths is characterized by a center wavelength and said center wavelength is tunable over a range of about 65 nm (pg. 10, lines 25-27).

Claim 20

Johansen as applied above further discloses wherein said distribution of transmitted wavelengths is characterized by a bandwidth and said band width has a value selected from the range of about 1 nm to about 100 nm (pg. 10, line 27).

Claim 21

Johansen as applied above further discloses wherein said selectably adjustable wavelength selector comprises a monochromator (pg. 10, line 20-pg. 11, line 2).

Claim 22

Johansen as applied above further discloses wherein said selectably adjustable wavelength selector comprises a spectrometer (pg. 2, lines 20-25).

Claim 25

Johansen as applied above further discloses wherein said detector is a charge coupled device (pg. 6, lines 6-9).

Claim 26

Johansen as applied above further discloses wherein said dielectric layer has a first refractive index, wherein said dielectric sample layer has a second refractive index which is less than said first refractive index and wherein said light propagating along said incident light propagation axis undergoes total internal reflection upon interaction with said optical assembly (pg. 1, lines 22-34).

Claim 27

Johansen as applied above further discloses wherein said dielectric sample layer is a sample provided by said flow cell (pg. 5, lines 22-25).

Claims 28 & 29

Johansen as applied above further discloses in conjunction with Fig. 2c, a flow cell 280 operationally connected to said optical assembly for introducing a sample into said probe region and wherein said dielectric sample layer is a sample provided by said flow cell (pg. 7, lines 14-26).

Claim 30

Johansen as applied above further discloses wherein said conducting layer comprises a gold film (pg. 5, lines 19-21).

Claim 31

Johansen as applied above further discloses wherein said first refractive index layer and said conducting layer comprises a waveguide (Fig. 2d, 300).

Claim 32

Johansen as applied above further discloses wherein said first refractive index layer and said conducting layer comprises an optical fiber (pg. 5, lines 30-31 & pg. 6, lines 15-16).

Claim 33

Johansen as applied above further discloses a surface plasmon imagin device (pg. 5, lines 11-12).

Claim 34

Johansen as applied above further discloses wherein said light source is an incoherent light source (pg. 5, lines 26-29).

Claim 35

Johansen as applied above further discloses in conjunction with Fig. 2c, a microfluidic flow cell 280 operationally connected to said optical assembly for introducing a sample into said probe region (pg. 7, lines 14-26).

Claim 36

Johansen as applied above further discloses in conjunction with Fig. 2c, wherein said surface of said conducting layer in contact with said second layer comprises a side of said microfluidic flow cell (pg. 7, lines 21-26).

Claim 37

Johansen as applied above further discloses wherein said surface of said conducting layer is modified to provide for selective binding affinity (pg. 7, lines 14-26).

Claim 38

Johansen as applied above further discloses wherein said surface of said conducting layer in contact with said dielectric sample layer is modified to provide for selective adsorption characteristics (pg. 7, lines 14-26 & pg. 3, lines 27-30).

Claims 39, 42, 43, 44, 45, 46, 47, 48, 49, 51, 52, 53, 55, 56, & 59

The apparatus of Johansen as applied above with respect to claims 1, 6, 5, 7, 8, 10, 13, 16, 17, 26, 3, 2, 28, 37, & 35, respectively, can perform the methods as claimed by Applicant.

Claims 40 & 41

It is inherent that the apparatus disclosed by Johansen as applied above and in conjunction with Figs. 1b & 9 rotates the interference filter 860 systematically through first, second and third wavelength distributions in order to analyze the collected data i.e. spectral quality (reflectance) with computer 900 over the different distribution of wavelength bandwidths in order to improve system sensitivity i.e. spectral quality (pg. 3, lines 10-29).

Claim 50

Johansen as applied above further discloses wherein said step of passing light through a polarizer generates light having a p-polarization state propagating along said incident light propagation axis (pg. 8, lines 14-18).

Claim 54

Johansen as applied above further discloses wherein said light has wavelengths in the near infrared region of the electromagnetic spectrum (Fig. 12).

Claims 57 & 58

Johansen as applied above further discloses the step of flowing chemical species through said flow cell, thereby changing the refractive index of said probe region and the step of flowing chemical species through said flow cell, thereby changing the thickness of said probe region (pg. 7, lines 14-26 & pg. 9, lines 16-21).

Claim 60

The apparatus of Johansen as applied above with respect to claims 1 can perform the method as claimed by Applicant.

Claim 61

Johansen as applied above further discloses wherein the said detector is a charge coupled device (pg. 6, lines 6-7).

Claim 62

The apparatus of Johansen as applied above with respect to claims 1 can perform the method as claimed by Applicant. Further, it is inherent that the apparatus disclosed by Johansen as applied above and in conjunction with Figs. 1b & 9 rotates the interference filter 860 systematically through first, second and third wavelength distributions generating both reference and analytical measurements in order to analyze the collected data i.e. spectral quality (reflectance) with computer 900 over the different distribution of wavelength bandwidths in order to detect a change in the refractive index of said probe region (pg. 3, lines 10-29, pg. 6, lines 20-22, & pg. 9, line 32-pg. 10, line 14).

Claims 63 & 64

Johansen as applied above further discloses wherein said optical assembly further comprises a flow cell (Fig. 2c, 280) for introducing chemical species into said probe region (pg. 7, lines 14-26).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claim 9 rejected under 35 U.S.C. 103(a) as being unpatentable over Johansen.

Claim 9

It is the position of the Office that even though the reference of Johansen does not specifically disclose the use of a linear interference filter, it does outline the importance of using an interference filter to filter out bands of selected wavelengths (pg. 9, lines 6-11). In light of the applicants disclosure, there is no critically distinguishing linear interference filter feature in the applicants disclosure that exemplifies novelty over prior art disclosure. Therefore producing the same results as the applicants limitation, therefore the reference of Johansen reads on applicants claimed limitation.

8. Claims 12, 15, 18, 23 & 24 rejected under 35 U.S.C. 103(a) as being unpatentable over Johansen in view of Partridge et al. (USPN '155, hereinafter Partridge).

Claims 12, 15, & 18

Johansen discloses the claimed invention except for the equation given by Applicant to define the center wavelength of a particular distribution of a band of wavelengths. It is inherent to someone of ordinary skill in the art of surface plasmon resonance at the time of the invention was made to find the optimum band (distribution) of wavelengths or center wavelength, since it has been held that discovering an optimum value or workable range of a result effective variable involves only routine skill in the art. Johansen does not disclose a specific equation to find an optimum wavelength, but does discloses the importance of a center wavelength and index of

refraction of a sample layer in order to produce a highly sensitive SPR imaging apparatus (pg. 5, lines 11-18, pg. 6, lines 1-5). Further, it is obvious and well known to someone of ordinary skill in the art at the time of the claimed invention that interference filters/gratings can be rotated/tilted in order to change their transmission characteristics.

Johansen substantially teaches the claimed invention except that it fails to show an interference filter with an adjustable tilt angle range. Partridge shows that it is known to provide a interference filter with an adjustable tilt angle (col. 3, lines 23-28, Fig. 1, ref. 10) for an spectroscopic measurement apparatus. It would have been obvious to someone of ordinary skill in the art to combine the device of Johansen with the interference filter having an adjustable tilt angle of Partridge for the purposes of providing selective wavelength transmission of the optical measurement beam (col. 3, lines 23-28). Accordingly, such modification would have constituted an alternative means/obvious engineering expedience for one of ordinary skill in the art at the time the invention was made.

Claims 23 & 24

Johansen substantially teaches the claimed invention except that it fails to show an interference filter comprising a prism or grating. Partridge shows that it is known to provide an interference filter comprising a prism or a grating (col. 5, lines 13-19, Fig. 2, ref. 10) for an optical wavelength modulating apparatus. It would have been obvious to someone of ordinary skill in the art to combine the device of Johansen with the interference filter having an adjustable tilt angle of Partridge for the purposes of providing selective wavelength transmission of the optical measurement beam (col. 5, lines 20-23). Accordingly, such modification would have

constituted an alternative means/obvious engineering expedience for one of ordinary skill in the art at the time the invention was made.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Juan D Valentin II whose telephone number is (571) 272-2433. The examiner can normally be reached on M-Th., Every other Fr..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank G Font can be reached on (571) 272-2415. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Juan D Valentin II
Examiner 2877
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May 28, 2004

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